

WHAT IS CLAIMED IS:

- 1 1. A method, comprising:
 - 2 detecting a write command to a frame buffer;
 - 3 determining a region in the frame buffer associated with a frame buffer address in
 - 4 the write command; and
 - 5 determining whether the region is the same as a last-modified region.
- 1 2. The method of claim 1, further comprising:
 - 2 when the region is not the same as the last-modified region,
 - 3 sending the region to a display device associated with the frame buffer, and
 - 4 setting the last-modified region to be the region.
- 1 3. The method of claim 1, further comprising:
 - 2 when the region is the same as the last-modified region, refraining from sending
 - 3 the region to the display device until a different region is detected.
- 1 4. The method of claim 1, wherein the write command is issued by a graphics engine to
- 2 the frame buffer.
- 1 5. The method of claim 1, wherein the frame buffer comprises a plurality of regions each
- 2 representing a plurality of pixels on a display device, and wherein the region is one of the
- 3 plurality of regions.
- 1 6. The method of claim 5, wherein the plurality of regions represent the plurality of pixels
- 2 in a rectangular shape on the display device.
- 1 7. The method of claim 6, wherein each of the plurality of regions represents a same
- 2 number of pixels.

1 8. The method of claim 4, wherein the detecting is carried out by logic connected to the
2 frame buffer and the graphics engine.

1 9. An apparatus, comprising:
2 a graphics engine to:
3 generate a write command having an associated region in a frame buffer,
4 determine whether scan-out logic is accessing the associated region in the
5 frame buffer, and
6 store the write command in memory associated with the graphics engine
7 when the scan-out logic accesses the associated region in the frame buffer.

1 10. The apparatus of claim 9, wherein the graphics engine is further to:
2 send the write command to the frame buffer when the scan-out logic is not
3 accessing the associated region in the frame buffer.

1 11. The apparatus of claim 9, wherein the frame buffer comprises a plurality of regions
2 each representing a plurality of pixels on a display device, and wherein the associated
3 region is one of the plurality of regions.

1 12. An apparatus for writing to a display device, comprising:
2 a frame buffer comprising a plurality of regions, wherein each region represents a
3 respective plurality of pixels on the display device; and
4 logic to accumulate writes by a graphics engine to one of the plurality of regions
5 in the frame buffer until the graphics engine writes to another region of the plurality of
6 regions in the frame buffer, wherein when the graphics engine writes to the another
7 region, the logic is to cause the one region to be written to the display device.

1 13. The apparatus of claim 12, wherein the logic comprises a plurality of D-type flip-
2 flops.

1 14. The apparatus of claim 13, wherein one of the plurality of D-type flip-flops is to
2 receive input of a region number of the one region and a clock input to be active when
3 each of the respective writes occurs.

1 15. A signal-bearing medium comprising instructions, which when read and executed by a
2 processor comprise:

3 accumulating writes by a graphics engine to one of a plurality of regions in a
4 frame buffer, wherein the plurality of regions represent respective pixels on a display
5 device;

6 detecting that the graphics engine has written to another region of the plurality of
7 regions in the frame buffer; and

8 in response to the detecting, causing the one region to be written to the display
9 device.

1 16. The signal-bearing medium of claim 15, wherein the detecting further comprises
2 converting frame buffer addresses in the writes to region numbers.

1 17. The signal-bearing medium of claim 15, wherein the causing further comprises:
2 instructing scan-out logic to copy the one region from the frame buffer to the
3 display device asynchronously from the writes to the frame buffer.

1 18. An apparatus, comprising:

2 a first D-type flip-flop including

3 a first data input to indicate a region number of a region currently being
4 written to a frame buffer, and

5 a first clock input to be active when a write to the frame buffer has
6 occurred.

1 19. The apparatus of claim 18, further comprising:

2 a second D-type flip-flop, including

3 a second data input coupled to a first output of the first D-type flip-flop,
4 and
5 a second clock input coupled to a compare logic output.

1 20. The apparatus of claim 19, further comprising:
2 a third D-type flip-flop, comprising:
3 a third data input coupled to a second output of the second D-type flip-flop,
4 and
5 a third clock input to be active when the write to the frame buffer has
6 occurred.

1 21. The apparatus of claim 20, further comprising:
2 compare logic, comprising:
3 a first compare data input coupled to the second output of the second D-
4 type flip-flop, and
5 a second compare data input coupled to the first output of the first D-type
6 flip-flop.

1 22. The apparatus of claim 20, where the third D-type flip-flop further comprises:
2 a third output to indicate a region number of a region to be sent to a display
3 device, wherein the third output is connected to a scan-out logic, wherein the scan-out
4 logic is connected to a display device..

1 23. A electronic device comprising:
2 a frame buffer comprising a plurality of regions each representing a respective
3 plurality of pixels on a display device;
4 a graphics engine to initiate writes to one of the plurality of regions in the frame
5 buffer;
6 snoop logic to cause the frame buffer to accumulate the writes; and

7 scan-out logic to write the one of the plurality of regions from the frame buffer to
8 the display device when instructed by the snoop logic.

1 24. The electronic device of claim 23, wherein the snoop logic comprises a plurality of D-
2 type flip-flops.

1 25. The electronic device of claim 24, wherein the D-type flip-flop further comprises an
2 exclusive-or gate.

1 26. An electronic device, comprising:
2 a graphics engine to, for every respective modified region in a set of candidate
3 regions,
4 copy the respective modified region from a frame buffer to a display,
5 when the respective modified region was written to during the copy, mark
6 the respective modified region as modified, and
7 when the respective modified region was not written to during the copy,
8 mark the respective modified region as not modified.

1 27. The electronic device of claim 26, wherein the set of candidates comprises all regions
2 that have not been written to during a most recent period of time.

1 28. The electronic device of claim 26, wherein the set of candidates comprises all regions
2 except a number of most-recently written to regions.

1 29. The electronic device of claim 26, wherein the set of candidates comprises a number
2 of least-recently written to regions.

1 30. The electronic device of claim 26, wherein the set of candidates comprises all regions
2 being displaced from the frame buffer.